

Preliminary

**SPECIFICATION
AND
DATA SHEET**

GYROSTAR[®]

**MODEL: ENC-05EA
and
ENC-05EB**

**- Piezoelectric Vibratory Gyroscope -
designed for Video Movie Camera Application**

MURATA MANUFACTURING CO. LTD.

Gyrostar[®] ENC-05EA and ENC-05EB

Piezoelectric Vibrating Gyroscope

Preliminary Technical Specification

Characteristics	Symbol	Condition	MIN.	STD.	MAX.	Unit
Supply voltage	V _{cc}		+4.75	+5.00	+5.25	VDC
Current consumption	I _{cc}	at V _{cc} =5.0 VDC	2.5	3.5	5.0	mA
Comparative voltage	V _{ref}	at -5 ~ 75° C	+2.15	+2.3	+2.45	VDC
Output	V _o	at -5 ~ 75° C at angular velocity = 0	+1.3	+2.3	+3.3	VDC
Max. angular velocity	ω max.			± 90		deg/sec
Scale factor	S _v		-20%	1.11	+20%	mV/deg/sec
Output with external Amp. acc. to page		at ± 90 deg/sec	+0.8	+1.0	+1.2	VDC
Temp. coefficient of scale factor		at -5 ~ 75° C reference: T _a	-20	---	+10	%FS
Oscillator frequency: - Version ENC-05EA - Version ENC-05EB	f _a f _b			25.0 26.5		kHz kHz
Oscillator frequency disparity	f _a - f _b	within operating temp. range: -5 ~ 75° C		≥ 500		Hz
Linearity		within ± 90 deg/sec	---	---	± 5	%FS
Response		phase delay: 90 deg.	---	50	---	Hz
Noise: measured with external circuit acc. to page 5/6			---	---	30	mVpp
Operating temp. range	T _{opr}		-5	---	75	°C
Storage temp. range	T _{stg}		-30	---	85	°C
Weight			---	2.7	---	gr
Size			22 x 9 x 8			mm

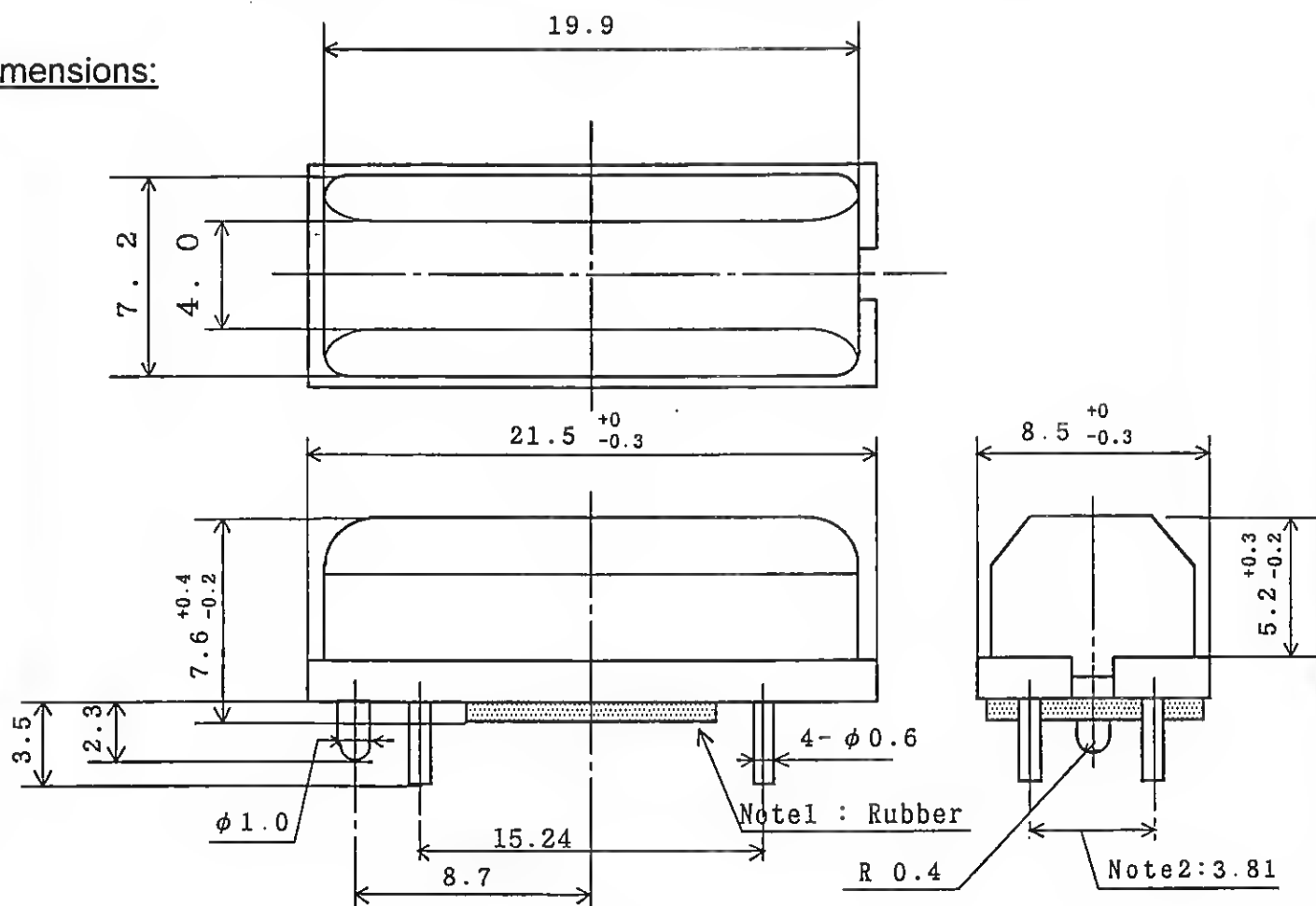
- ❶ (Unless otherwise specified: ambient temp. T_a = 25° C, V_{opr} = 5.0VDC,
V_{ref} is grounded with 4.7 μ F)

Gyrostar[®] ENC-05EA and ENC-05EB

Piezoelectric Vibrating Gyroscope

Preliminary Dimensions and Data of Case:

Dimensions:



all dimensions are in "mm"

Unless otherwise specified, measurement tolerance = ± 0.2 mm

Note1: Rubber size 13.5 X 7.5 X 0.5 mm (measurement tolerance = ± 0.3 mm)

Note2: Measured at 1 mm under case bottom

Data of Case:

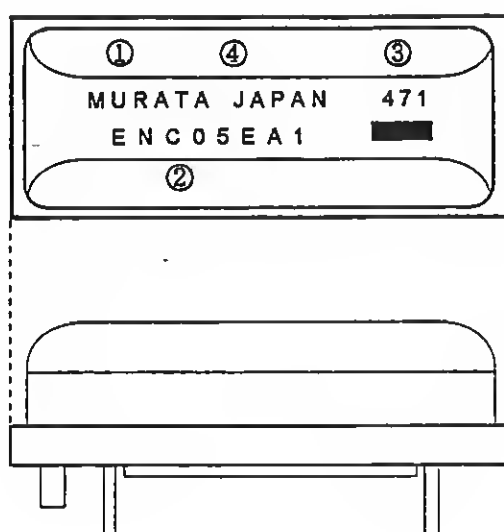
Metal cover	:	Nickel alloy
Resin base	:	PBT
Shock absorber	:	Rubber
Pin	:	HCP
Adhesive	:	Silicon

Gyrostar® ENC-05EA and ENC-05EB

Piezoelectric Vibrating Gyroscope

Marking and Terminal Connections

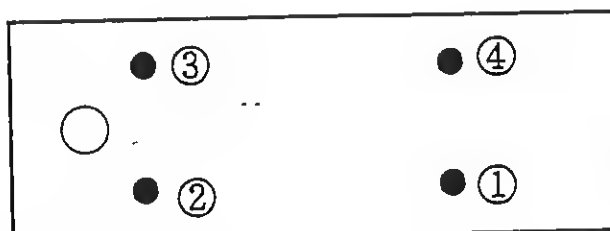
Marking:



- ① Manufacturing company
- ② Model name
- ③ Manufacturing lot number
- ④ Manufacturing country

Terminals:

Terminal	Symbol	Description
①	Vcc	+Supply voltage
②	Vref	Comparative voltage
③	Gnd	Ground (GND)
④	Out	Sensor output

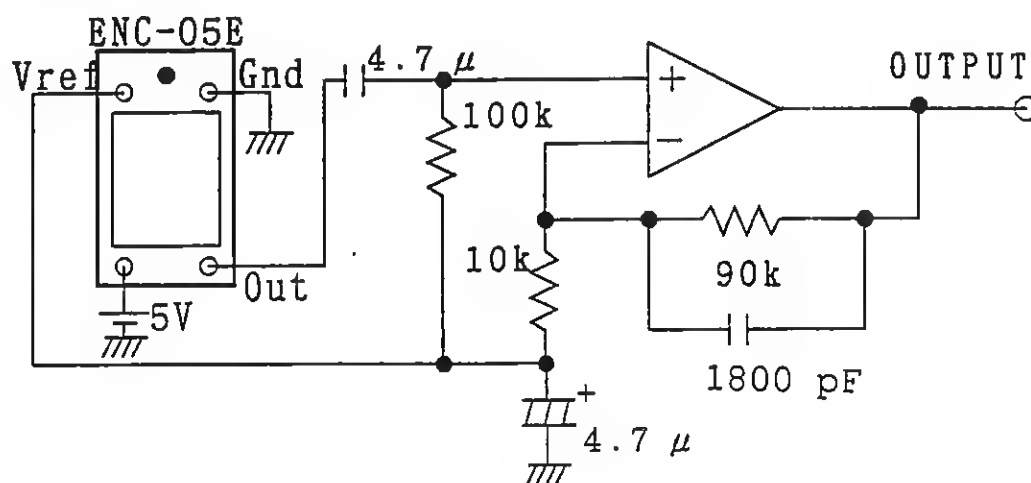


Gyrostar® ENC-05EA and ENC-05EB

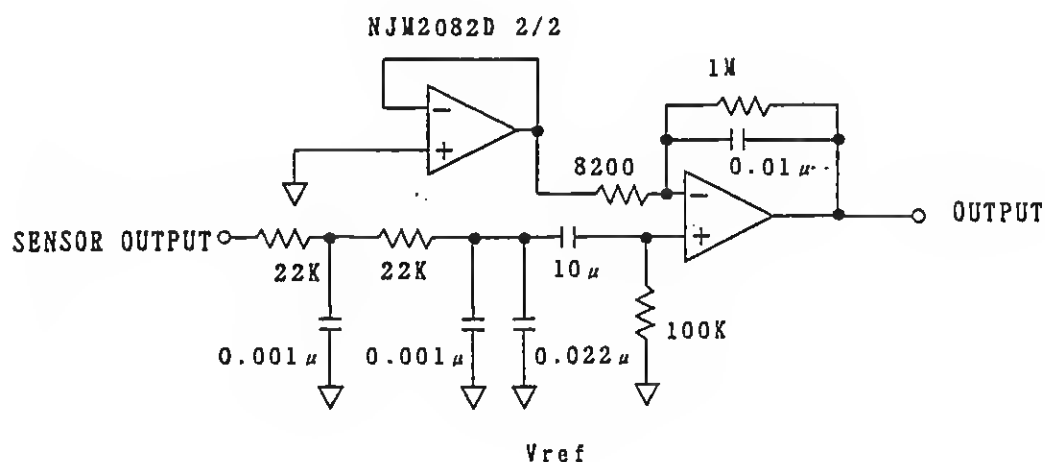
Piezoelectric Vibrating Gyroscope

Measurement circuit

Amplifier circuit



Noise measurement circuit



Gyrostar® ENC-05EA and ENC-05EB

Piezoelectric Vibrating Gyroscope

NOTES

1. If you want to use the Gyrostar for detecting just X-axis, use model ENC-05EA.

If you want to use the Gyrostar for detecting X-axis and Y-axis at a time, use ENC-05EA and ENC-05EB. This avoids cross coupling.

2. Incorrect handling may affect sensor characteristics.

Please note the following precautions:

- * Do not subject the sensor to shock that exceeds the rated limit.
- * Do not subject the sensor to a magnetic field exceeding 50 gauss.
- * Do not install the sensor in a location in which condensation is likely to form on it.
- * Do not wash the sensor.
- * Do not disassemble the sensor.
- * Do not bend the sensor terminal.

3. Precision electronic parts, such as ICs and regulators, are used for the sensor; therefore, it is necessary to take anti-static measures when handling.

4. This specification is defining the characteristic of the component as single unit. Please make sure that the component is evaluated and confirmed against the specification before it is mounted.

5. We cannot warrant against mishaps caused by any use of this product deviating from the intended use as described in this specification.

6. Please return one copy of these drawings upon approval. If the copy is not returned within 3 months, the approval drawings will be deemed to have been approved.

Specification

of

GYROSTAR[®]

- Piezoelectric Vibratory Gyroscope -

MODEL: ENV-05H-01

**Support Sensor for
GPS Navigation**

⊛ replaces previous preliminary model part number ENX-0031A

**Issue no. 2
02.05.95**

MURATA MANUFACTURING CO. LTD.

Gyrostar® ENV-05H-01

Piezoelectric Vibratory Gyroscope

Structural characteristics

External Dimensions	24 x 40 x 48 mm max. (details of mechanical construction see figure 1)
Material of case	molded resin case (black)
Weight	50 gr. max.
Length of connecting cable	150 mm
Connector	Co. SMK, Japan : Type W-A2503-IN (3 terminal type)

Marking

- (1) Commodity name
- (2) Model name
- (3) Serial number
- (4) Manufacturing company

(1)	GYROSTAR
(2)	ENV-05H-01
(3)	5N3
(4)	muRata Japan

Terminal connections

Terminal wire colour	Terminal No.	Description	Symbol
red	①	Supply voltage	Vcc
black	②	Ground	GND
white	③	Sensor output	Out

Mounting

Use 4 pcs. machine screws M3, max. 10 mm long

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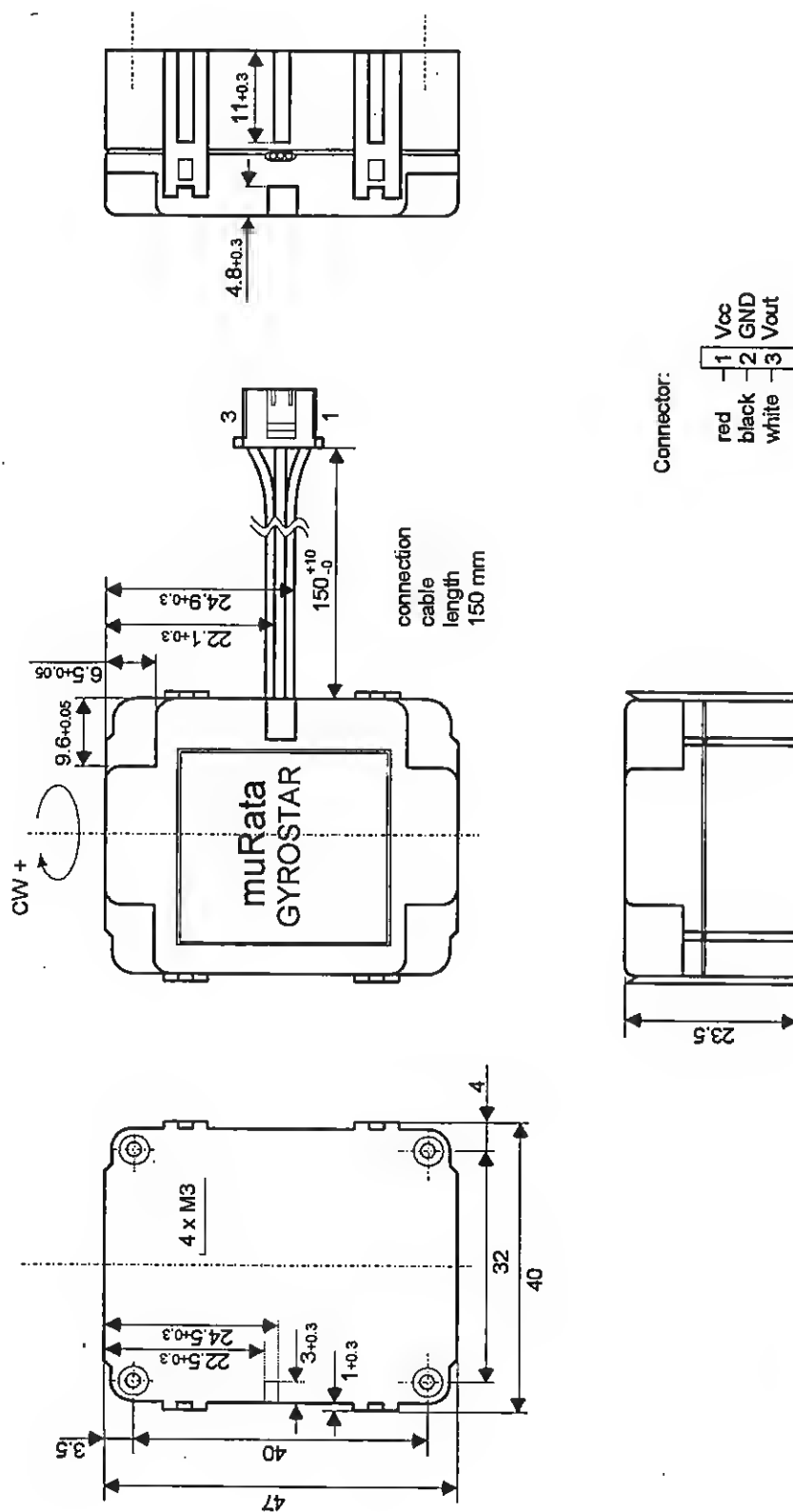
Gyrostar[®] ENV-05H-01

Piezoelectric Vibratory Gyroscope

Technical Specification

1. Supply voltage V_{cc}	+5.0 VDC ± 0.5 VDC
2. Current consumption I_{cc}	15 mA max.
3.1 Angular velocity ω	± 90 deg./sec @ $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
3.2 Max. angular velocity ω max.	± 60 deg./sec @ -30°C to 80°C
4. Output Voltage V_o	+2.5 V ± 300 mV @ $\omega = 0$ (within temperature range -30°C to 80°C)
5. Scale factor S_v	22.2 ± 0.67 mV/deg/sec @ $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 22.2 ± 2.90 mV/deg/sec @ -10°C to 60°C 22.2 ± 4.00 mV/deg/sec @ -30°C to 80°C
6. Linearity	within $\pm 0.5\%$ FS of max. angular velocity range
7.1. Resolution	0.1 deg/sec. max.
7.2. Asymmetry CW & CCW	3 deg/sec. max
8. Response	7 Hz (Phase delay 90°)
9. Offset drift	23 deg./sec max (equiv.: 500 mV _{pp}) (@ operating temperature range -30°C to 80°C)
10. Zero point stability (start-up)	Within ± 20 mV/10 min. (V_o measured after 5 sec @ stable temp. $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$)
11. Operating temperature range T_{opr}	-30°C to 80°C
12. Storage temperature range T_{stg}	-40°C to 85°C
13. Dependence on Supply voltage	Δ Scale factor (%) = $(1.1 \pm 0.2) \Delta V_{cc}(\%)$ Δ Output voltage (%) = $(1.0 \pm 0.2) \Delta V_{cc}(\%)$ (@ $V_{cc} = 5.0$ V)
14. Output noise level	≤ 10 mV _{rms} @ 8 kHz

EXTERNAL DIMENSIONS OF GYROSTAR ENV-05H-01 and ENV-05H-02



Measurement Tolerance = ± 0.2
Unit: mm

Figure 1

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Specification

of

GYROSTAR[®]

- Piezoelectric Vibratory Gyroscope -

MODEL: ENV-05H-02



**Support Sensor for
Vehicle Navigation**

⊙ replaces previous preliminary model part number ENX-0031B

**Issue no. 2
02.05.1995**

Gyrostar® ENV-05H-02

Piezoelectric Vibratory Gyroscope

Structural characteristics

External Dimensions	24 x 40 x 48 mm max. (details of mechanical construction see figure 1)
Material of case	molded resin case (black)
Weight	50 gr. max.
Length of connecting cable	150 mm
Connector	Co. SMK, Japan : Type W-A2503-IN (3 terminal type)

Marking

- (1) Commodity name
- (2) Model name
- (3) Serial number
- (4) Manufacturing company

(1)	GYROSTAR
(2)	ENV-05H-02
(3)	5N3
(4)	muRata Japan

Terminal connections

Terminal wire colour	Terminal No.	Description	Symbol
red	①	Supply voltage	Vcc
black	②	Ground	GND
white	③	Sensor output	Out

Mounting

Use 4 pcs. machine screws M3, max. 10 mm long

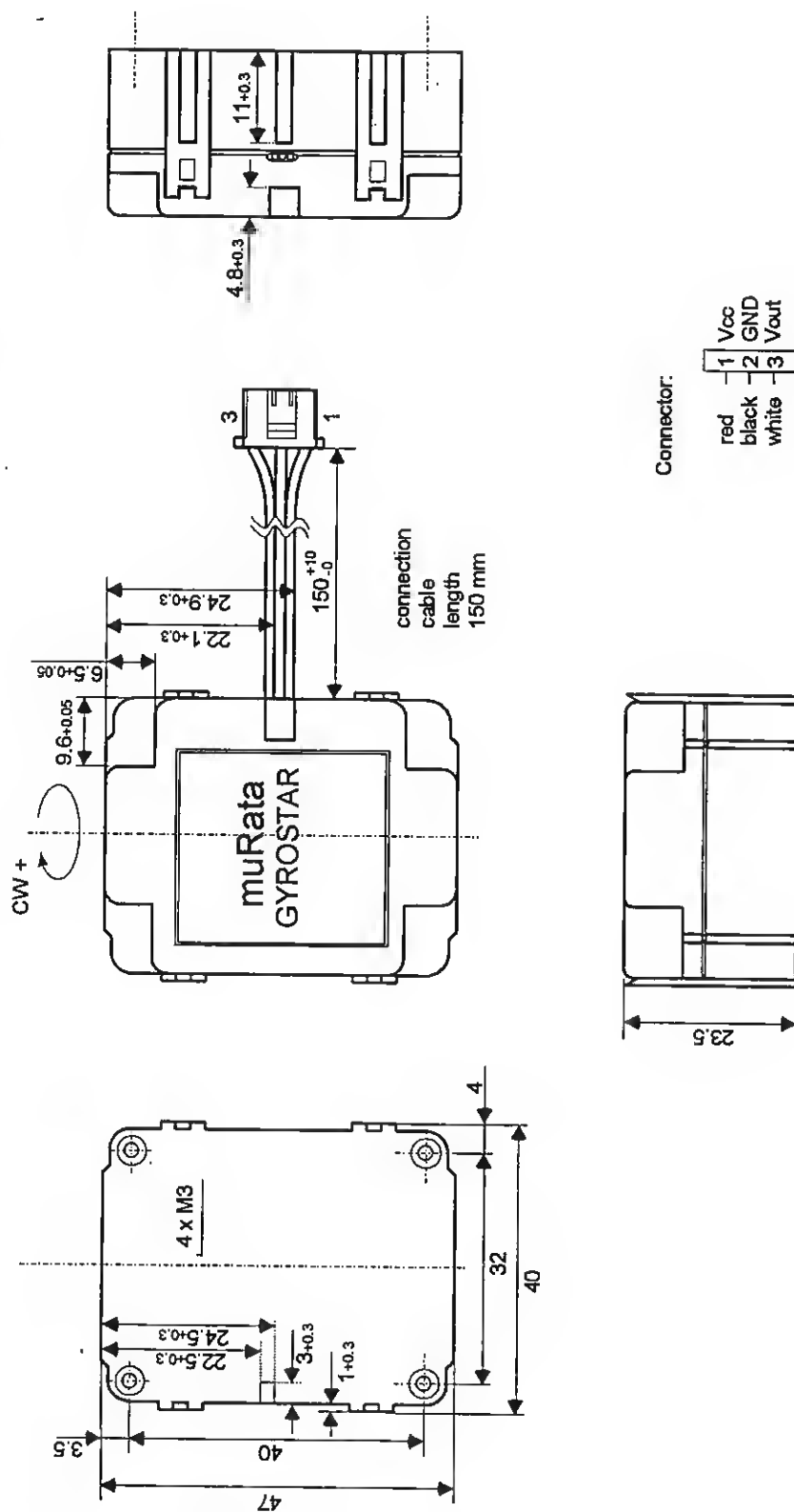
Gyrostar® ENV-05H-02

Piezoelectric Vibratory Gyroscope

Technical Specification

1. Supply voltage V_{cc}	+5.0 VDC ± 0.5 VDC
2. Current consumption I_{cc}	15 mA max.
3.1 Angular velocity ω	± 90 deg./sec @ $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
3.2 Max. angular velocity ω max.	± 80 deg./sec @ -30°C to 80°C
4. Output Voltage V_o	+2.5 V ± 300 mV @ $\omega = 0$ (within temperature range -30°C to 80°C)
5. Scale factor S_v	22.2 ± 0.67 mV/deg/sec @ $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 22.2 ± 1.80 mV/deg/sec @ -10°C to 60°C 22.2 ± 2.90 mV/deg/sec @ -30°C to 80°C
6. Linearity	within $\pm 0.5\%$ FS of max. angular velocity range
7.1. Resolution	0.1 deg/sec. max.
7.2. Asymmetry CW & CCW	3 deg/sec. max
8. Response	7 Hz (Phase delay 90°)
9. Offset drift	9 deg./sec max (equiv.: 200 mV _{pp}) (@ operating temperature range -30°C to 80°C)
10. Zero point stability (start-up)	Within ± 20 mV/10 min. (V_o measured after 5 sec @ stable temp. $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$)
11. Operating temperature range T_{opr}	-30°C to 80°C
12. Storage temperature range T_{stg}	-40°C to 85°C
13. Dependence on Supply voltage	Δ Scale factor (%) = $(1.1 \pm 0.2) \Delta V_{cc}(\%)$ Δ Output voltage (%) = $(1.0 \pm 0.2) \Delta V_{cc}(\%)$ (@ $V_{cc} = 5.0$ V)
14. Output noise level	≤ 10 mV _{rms} @ 8 kHz

EXTERNAL DIMENSIONS OF GYROSTAR ENV-05H-01 and ENV-05H-02



Measurement Tolerance = ± 0.2
Unit: mm

Figure 1

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